

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Title: A HOCKEY STICK BLADE
Application No.: 10/772,316
Applicant: Leo Sartor et al.
Filed: February 6, 2004
Art Unit: 3711
Examiner: Mark S. Graham
Confirmation No.: 6480
Docket No.: 14610

APPELLANT'S BRIEF UNDER 37 C.F.R. 1.191

Commissioner of Patents
Alexandria VA 22313-1450
U.S.A.

Sir:

The following is the Appellant's Brief, submitted in triplicate and under the provisions of 37 C.F.R. 1.191. The fee of \$500 required by 37 C.F.R. 41.20(b)(2) is enclosed.

A Real Party in Interest

The real party in interest is the assignee of record, i.e. Bauer Nike Hockey Inc., 1200 Internationale Street, St-Jérôme, Quebec, Canada, J7Y 5G2.

B Related Appeals and Interferences

There are no related appeals or interferences that will directly affect, be directly affected by or have a bearing on the present appeal.

01/16/2007 JADD01 00000058 10772316

01 FC:1402

500.00 OP

C Status of Claims

Claims 1 to 10 are rejected.

Claims 11 and 12 are cancelled.

Claims 13 to 17 are rejected.

Claims 18 to 29 are cancelled.

Claims 30 to 32 are rejected.

The present appeal is directed to claims 1 to 10, 13 to 17 and 30 to 32.

D Status of Amendments

No amendment has been made subsequent to issuance of the Final Office Action of June 9, 2006.

E Summary of the Invention

As indicated in the specification at page 1, lines 10 to 15, it is known to manufacture hockey stick blades using layers of fibers material impregnated in resin:

“Typical hockey stick blades or replacement blades are generally made of a wooden core reinforced with one or more layers of synthetic material such as fiberglass, carbon fibers or graphite. The core of the blade may also be made of a synthetic material reinforced with layers of fibers material. The layers are usually made of woven filament fibers, typically soaked in a resin and glued to the surfaces of the core of the blade. Expandable fibers braids may also be used for recovering the core of the blade.”

The Appellant has however recognized that the impact resistance of the hockey stick blade is increased by covering these layers of fibers with a sheet of thermoplastic material. The Appellant has therefore made a significant advance in the art of hockey blade construction by recognizing that the impact resistance of the blade is increased by covering at least partially the second layer of fibers with a sheet of thermoplastic material such that this sheet of thermoplastic material forms part of one of the front and rear external surfaces of the blade.

Independent claim 1 reads as follows:

1. A hockey stick blade with a shank and a blade element having a front external surface and a rear external surface, said hockey stick blade comprising:
 - (a) a core made of thermo-expandable foam and extending along a longitudinal axis;
 - (b) a first layer of fibers at least partially wrapping over said core; said first layer of fibers being impregnated with a suitable resin;
 - (c) a second layer of fibers at least partially wrapping over said first layer of fibers, said second layer of fibers being impregnated with a suitable resin; and
 - (d) a sheet of thermoplastic material covering at least partially said second layer of fibers, said sheet of thermoplastic material forming part of one of said front and rear external surfaces of said blade element for increasing the impact resistance of said blade.

As indicated in the specification, the core comprises "first and second sections 32, 34 that are made of synthetic material such as a thermo-expandable foam selected in the group consisting of polyurethane foam, ethylene vinyl acetate (EVA) foam, polyvinyl chloride (PVC) foam, ethylene polypropylene foam and polyisocyanurate foam." (page 5, lines 18 to 21).

As indicated in the specification, from line 30, page 8, to line 3, page 9:

"[...] the blade 10 comprises (a) the core 30 formed of the first and second portions 32, 34; (b) a layer of fibers 68 recovering the core 30, this layer being formed of a first layer of fibers comprising the fibers braids 48, 50, 52 and a second layer of fibers comprising the fibers braid 54; and (c) a layer of thermoplastic material 70 recovering the layer of fibers."

Figures 2 and 10 illustrating core 30, first layer of fibers made of fibers braids 48, 50, 52, second layer of fibers made of fibers braid 54 and the layer of thermoplastic material made of front and rear sheets 62, 64 are reproduced on the next page.

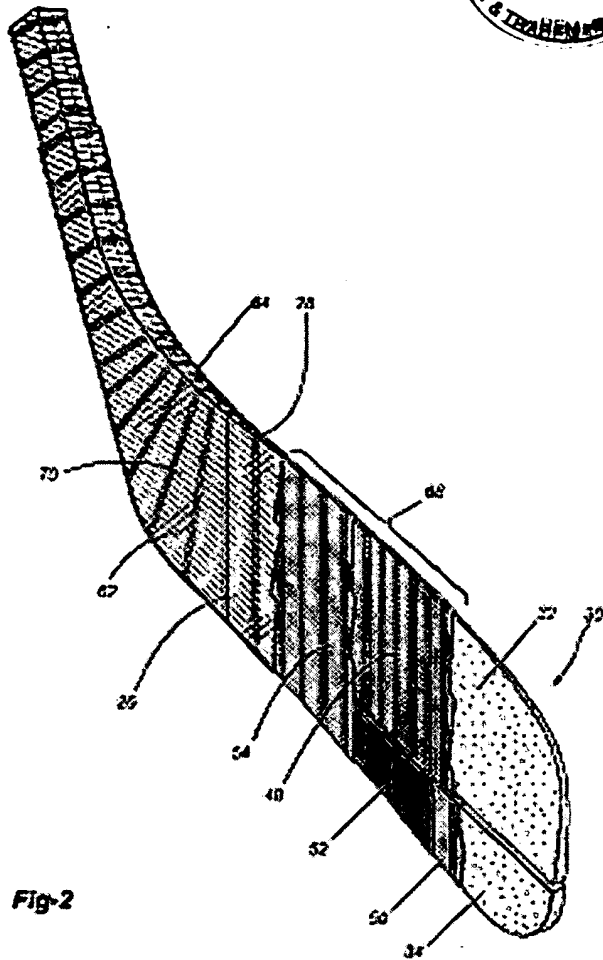


Fig-2

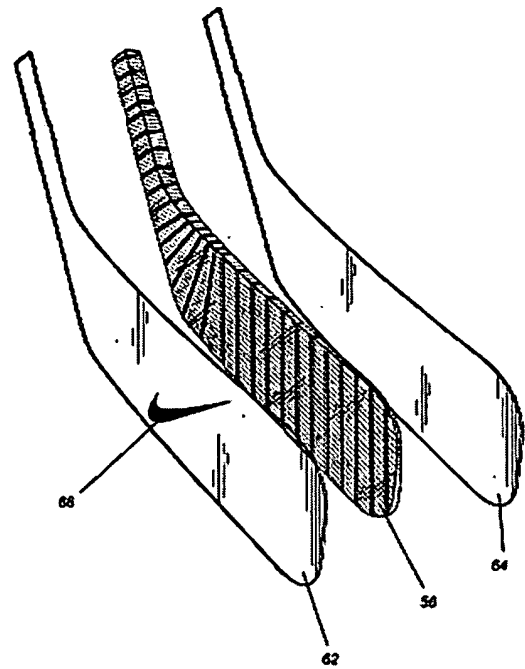


Fig-10

As indicated in the specification, at page 9, lines 6 to 9:

“The layer of thermoplastic material 70 comprises the front and rear sheets 62, 64 and forms part of the front and rear surfaces of the blade element 16 and the front and rear surfaces of the shank 12 (i.e. front and rear surfaces 26, 28).”

And, from line 27, page 9, to line 3, page 10:

“Because the front and rear surfaces 26, 28 of the blade 10 comprise the layer of thermoplastic material 70, the impact resistance of the blade 10 is greater than that of a blade having no external layer of thermoplastic material. For example, for the same blade construction, drop tests shown that the impact resistance increases of at least 50% for a

blade having an external layer formed of a thermoplastic polyurethane (TPU) sheet sold by Isosport IS under the name ISOCAP and at least 70% for a blade having an external layer formed of a thermoplastic polyurethane (TPU) sheet sold by Dow Chemical (density of 1.15-1.25 gr/cc and hardness of 73D).”

As indicated in the specification, the “fibers braids 48, 50, 52, 54 are expandable so as to conform to the shape of the first and second portions 32, 34 and are made of woven fibers selected from the group consisting of carbon fibers, glass fibers, KEVLAR fibers, ceramic fibers, boron fibers, quartz fibers, spectra fibers, polyester fibers and polyethylene fibers.” (page 7, lines 1 to 4).

Independent claim 31 reads as follows:

31. A hockey stick blade with a shank and a blade element having a front external surface and a rear external surface, said hockey stick blade comprising:
- (a) a core made of thermo-expandable foam and extending along a longitudinal axis;
 - (b) a first layer of fibers at least partially wrapping over said core; said first layer of fibers being impregnated with a suitable resin;
 - (c) a second layer of fibers at least partially wrapping over said first layer of fibers, said second layer of fibers being impregnated with a suitable resin; and
 - (d) front and rear thermoplastic sheets covering at least partially said second layer of fibers, said front and rear thermoplastic sheets forming part of said respective front and rear external surfaces of said blade element for increasing the impact resistance of said blade, said front and rear thermoplastic sheets being made of thermoplastic material selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate.

This claim specifies that the blade has front and rear thermoplastic sheets (see reference numerals 62, 64, Figure 10) and that these sheets are made of thermoplastic material selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate (see specification at lines 18 to 20, page 7).

F Issues

The sole issue at appeal is whether the Examiner erred in rejecting claims 1 to 6, 10 and 30 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 5,333,857 (Lallemand), claims 1, 6 to 9 and 13 to 16 under 35 U.S.C. §102(e) as being anticipated by PCT Application WO 03/097181 (McGrath *et al.*), claims 7 to 9, 13, 14, 31 and 32 as being obvious in view of Lallemand, claims 30 and 32 as being obvious in view of Lallemand in light of U.S. Patent 4,509,269 (Tiitola) and claim 17 as being obvious in view of McGrath *et al.* in light of U.S. Patent 6,273,835 (Battis *et al.*).

G Grounds of Rejection

1. 35 U.S.C. §102(b)

The Examiner suggests that claims 1 to 6, 10 and 30 are anticipated by Lallemand. However, to anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently.¹ Furthermore, inherency may not be established by probabilities or possibilities.²

As indicated in Lallemand, the superposed meshes 1, 2, 3 may be made from carbon, aramide, glass E, glass R, polyethylene HP (Dyneema), quartz fibers, etc. These meshes are impregnated with resin (such as pure or modified epoxy resin or thermoplastic resin) by using injection resin transfer molding (Resin Transfer Molding):

¹ In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997).

² In re Oelrich, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981) (quoting Hansgirk v. Kemmer, 102 F.2d 212, 214, 40 USPQ 665, 667 (CCPA 1939)).

“According to one embodiment of the stick, the first and the third meshes 1 and 3 are made of carbon fibers, the second mesh 2 being made from a mixture of carbon, quartz and polyethylene fibers (for example fibers of the mark DYNEEMA), for example in a proportion of 50%, 25% and 25%.

[...]

When the covering operation is complete, the impregnation of the stick is performed by means of a resin, such as pure or modified epoxy resin or a thermoplastic resin, or any other particularly fluid resin, by using the known process for impregnating fibers by low-pressure injection RTM (Resin Transfer Moulding), consisting of moulding by resin transfer.

[...]

Once the impregnation operation is over, the stick may again be dried, if required. Then it may be covered in paint, and the shaft may be covered with a varnish having a rough structure which prevents the stick sliding in the player's hands.” [Lallemand, column 3, lines 63 to 68; column 4, lines 28 to 45]

The cured blade of Lallemand therefore comprises a foam core covered by meshes 1, 2, 3 that are impregnated with a suitable resin.

In the Final Action, the Examiner indicates that “[...] mesh fiber layers 1, 2, 3 [of Lallemand's blade] are then impregnated and covered with a thermoplastic resin. The outermost layer of material [the claimed external surface made of sheet(s) of thermoplastic material] may be considered the thermoplastic sheet.”

The Appellant submits that the Examiner has erred in his assertion that Lallemand discloses a blade comprising “a sheet of thermoplastic material covering at least partially the second layer of fibers and forming part of one of the front and rear external surfaces of the blade”, as recited in claim 1.

Clearly, the mesh 3 cannot be qualified as a “thermoplastic sheet” since this mesh is of the same nature as the other meshes 1, 2 (i.e. fibers impregnated with resin) and there are no indications or

suggestions that the mesh 3 is of different nature, nor it is made of a thermoplastic sheet.

The Appellant further submits that a person skilled in art would never identify a layer of fibers impregnated with resin as being a sheet of thermoplastic material.

Indeed, in light of the specification and drawings, it is clear that the claimed sheet of thermoplastic material is a further element of the blade, an element that covers the second layer of fibers, forms part of the external surface(s) of the blade and is of a total different nature than the layers of fibers:

“A method of making the blade 10 is hereinafter described. As shown in Figure 5, a first fibers braid 48 is wrapped over the first portion 32 and a second fibers braid 50 is wrapped over the second portion 34. As shown in Figure 6, a third fibers braid 52 is wrapped over the second fibers braid 50 of the second portion 34. As shown in Figure 7, a fourth fibers braid 54 is wrapped over the first and third fibers braids 48, 52 of the first and second portions 32, 34 such as to realize a preformed blade 56 as illustrated in Figure 8. Note that the preformed blade 56 has the general shape of a straight hockey stick blade and comprises front and rear faces 58, 60 .

The fibers braids 48, 50, 52, 54 are expandable so as to conform to the shape of the first and second portions 32, 34 and are made of woven fibers selected from the group consisting of carbon fibers, glass fibers, KEVLAR fibers, ceramic fibers, boron fibers, quartz fibers, spectra fibers, polyester fibers and polyethylene fibers.

[...]

As shown in Figure 10, front sheet 62 and rear sheet 64 are used for covering the respective front and rear faces 58, 60 of the preformed blade 56 in the construction of a blade 10. The sheets 62, 64 are made of a thermoplastic material selected in the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate.

[...]

The preformed blade 56 and the thermoplastic sheets 62, 64 are afterwards inserted in a mold having the shape of the blade 10. A suitable resin (urethanes, araldite epoxy, vinylester, polycyanate or polyester resin) is then injected into the mold to impregnate the expandable fibers braids 48, 50, 52, 54 and heat is applied to the mold.

[...]

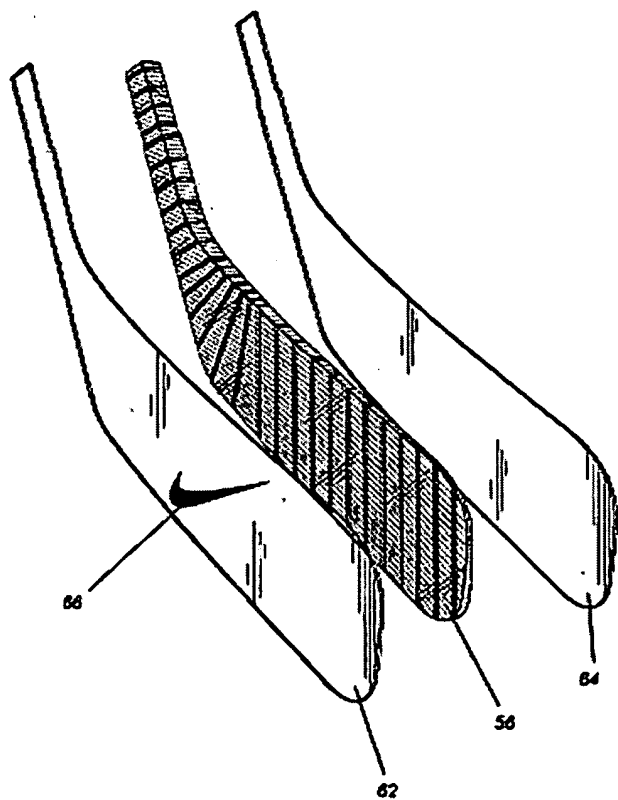


Fig- 10

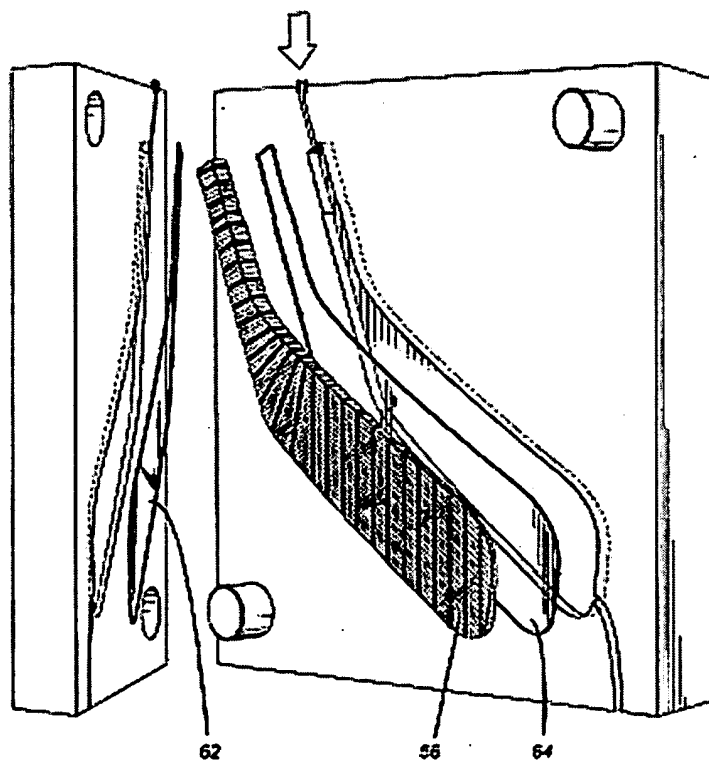


Fig- 11

As best shown in Figures 2 and 4, the blade 10 comprises (a) the core 30 formed of the first and second portions 32, 34; (b) a layer of fibers 68 recovering the core 30, this layer being formed of a first layer of fibers comprising the fibers braids 48, 50, 52 and a second layer of fibers comprising the fibers braid 54; **and (c) a layer of thermoplastic material 70 recovering the layer of fibers.**

The layer of thermoplastic material 70 comprises the front and rear sheets 62, 64 and forms part of the front and rear surfaces of the blade element 16 and the front and rear surfaces of the shank 12 (i.e. front and rear surfaces 26, 28).

[...]

Because the front and rear surfaces 26, 28 of the blade 10 comprises the layer of thermoplastic material 70, the impact resistance of the blade 10 is greater than that of a blade having no external layer of thermoplastic material. ” [specification, from line 23, page 6, to line 28, page 9]

Hockey stick blades comprising layers of fibers impregnated with resin have been used for the last several years and the Appellant is not seeking patent protection for such a well-known construction, nor is the Appellant seeking protection for a hockey blade having an outermost external layer made of fibers impregnated with a thermoplastic material.

The Appellant rather seeks patent protection for a novel and unobvious construction, namely a hockey stick blade comprising **a sheet of thermoplastic material** covering at least partially the second layer made of fibers **and forming part of one of the front and rear external surfaces of the blade.**

Moreover, nowhere in *Lallemand*, does the inventor teach or suggest that the use of a sheet of thermoplastic material forming part of the external surface(s) of the blade can increase its impact resistance, as recited in claim 1.

In view of the above, the Appellant submits that claim 1 is patentable over Lallemand and allowance of claim 1 is earnestly solicited. Because claims 2 to 6, 10 and 30 depend directly or indirectly from claim 1 and include by reference all of the features recited in claim 1, these claims are also patentable.

2 35 U.S.C. §102(e)

The Examiner suggests that claims 1, 6 to 9, 13 to 16 are anticipated by McGrath *et al.* However, to anticipate a claim, a prior art reference must disclose every limitation of the claimed invention, either explicitly or inherently. Furthermore, inherency may not be established by probabilities or possibilities.

As indicated in McGrath *et al.*, the blade comprises layers 510 or plies 520 that are made of fibers pre-impregnated with epoxy:

“In order to avoid manufacturing expenses related to transferring the resin into the mold, the matrix material may be pre-impregnated into the fibers or filaments, plies 520 or layers 510 prior to the uncured blade assembly being inserted into the mold and the mold being sealed. In addition, in order to avoid costs associated with employment of woven sleeve materials, it may be preferable that the layers 510 be comprised of one or more plies 520 of non-woven uni-directional fibers. Applicants have found that a suitable material includes uni-directional carbon fiber tape pre-impregnated with epoxy, manufactured by Hexcel Corporation of Salt Lake City, Utah, and also S & P Systems of San Diego, Calif.” [McGrath *et al.* , page 29, lines 27 to 35]

“With reference to FIG. 15A, the blade 30 constructions illustrated in FIGS. 14A through 14F and 18B are generally constructed in accordance with the following preferred steps. First, one or more plies 520, layers, or groups of fibers or filaments are wrapped over one or more inner core elements 500a-500c (e.g., wood, wood laminate, elastomer material, foam, bulk molding compound, etc.), which individually or in combination generally form the shape of the blade 30 illustrated in FIGS. 3, 7, or 13 (step 600) to create an

uncured blade assembly.

Once the uncured blade assembly is prepared, it is inserted into a mold that is configured to impart the desired exterior shape of the blade 30 or component thereof (step 610 of FIG. 15A). The mold is then sealed, after which heat is applied to the mold to cure the blade assembly (step 620 of FIG. 15A). The blade 30 is then removed from the mold and finished to the desired appearance (step 630 of FIG. 15A). The finishing process may include aesthetic aspects such as paint or polishing and also may include structural modifications such as deburring. Once the blade 30 is finished, the blade 30 is then ready for attachment to the shaft 20. .” [McGrath *et al.* , from page 30, lines 23 to 35, to page 31, lines 1 to 3]

In the Final Action, the Examiner indicates that “[t]hermoplastic material may be used as the resin and the outermost layer may be considered the thermoplastic sheet material.”

The Appellant respectfully submit that the Examiner has erred in his assertion that McGrath *et al.* teaches a blade comprising “a sheet of thermoplastic material covering at least partially the second layer of fibers and forming part of one of the front and rear external surfaces of the blade” as recited in claim 1.

Clearly, the layers 510 or plies 520 cannot be qualified as a “thermoplastic sheet” since they are made of fibers pre-impregnated with epoxy.

For the same reasons as those set forth above with respect to Lallemand, the Appellant reiterates that (i) a person skilled in art would never identify a layer made of fibers pre-impregnated with epoxy as being a sheet of thermoplastic material; and (ii) in light of the specification and drawings, it is clear that the claimed sheet of thermoplastic material is a further element of the blade, an element that covers the second layer of fibers, forms part of the external surface(s) of the blade and is of a total different nature than the layers of fibers.

Hence, the Appellant seeks patent protection for a novel and unobvious construction, namely a hockey stick blade comprising **a sheet of thermoplastic material** covering at least partially the

second layer made of fibers **and forming part of one of the front and rear external surfaces of the blade.**

Moreover, nowhere in McGrath *et al.*, do the inventors teach or suggest that the use of a sheet of thermoplastic material forming part of the external surface(s) of the blade can increase its impact resistance, as recited in claim 1.

In view of the above, the Appellant submits that claim 1 is patentable over McGrath *et al.* and allowance of claim 1 is earnestly solicited. Because claims 6 to 9 and 13 to 16 depend directly or indirectly from claim 1 and include by reference all of the features recited in claim 1, these claims are also patentable.

3 35 U.S.C. §103(e)

The Examiner suggests that claims 7 to 9, 13, 14, 31 and 32 are obvious in view of Lallemand, claims 30 and 32 are obvious in view of Lallemand in light of U.S. Patent 4,509,269 (Tiitola) and claim 17 is obvious in view of McGrath *et al.* in light of U.S. Patent 6,273,835 (Battis *et al.*)

In the Final Action, the Examiner indicates that “Lallemand discloses the claimed device with the exception of the particularly claimed foam and thermoplastic. However, the examiner took official note that the foams and thermoplastics claimed by applicant are commonly known and such is now admitted prior art. It would have been obvious to one of ordinary skill in the art to have chosen which ever of these was desired to obtain a particular strength, weight, or flexibility characteristic in the blade.” (page 3, last paragraph; page 4, first two lines).

The Appellant never admitted that the use of a sheet of thermoplastic material was commonly known. On the contrary. As indicated above, while hockey stick blades comprising layers of fibers impregnated with resin have been used for the last several past years, the Appellant seeks patent protection for a novel and unobvious construction, namely a hockey stick blade comprising **a sheet of thermoplastic material** covering at least partially the second layer made of fibers **and forming part of one of the front and rear external surfaces of the blade.**

Moreover, for the Examiner to establish a *prima facie* case of obviousness, three criteria must be considered: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings, (2) there must be a reasonable expectation of success, and (3) the prior art references must teach or suggest all of the claim limitations. MPEP §§ 706.02(j), 2142 (8th ed.). It is respectfully submitted that a *prima facie* case of obviousness has not been set out in the Office Action.

MPEP § 2142 (8th ed.) states as follows:

“The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).”

As previously indicated, while the claimed blade comprises a sheet of thermoplastic material covering at least partially the second layer of fibers and forming part of one of the front and rear external surfaces of the blade, the cited references do not disclose nor suggest a blade comprising the claimed sheet of thermoplastic material since the outermost layer of the Lallemand's blade is made of fibers (mesh 3) impregnated with resin and the layers 510 or plies 520 of the McGrath *et al.*'s blade are made of fibers pre-impregnated with epoxy.

The Appellant reiterates that (i) a person skilled in art would never identify a layer made of fibers pre-impregnated with epoxy as being a sheet of thermoplastic material; and (ii) in light of the specification and drawings, it is clear that the claimed sheet of thermoplastic material is a further element of the blade, an element that covers the second layer of fibers, forms part of the external surface(s) of the blade and is of a total different nature than the layers of fibers.

Moreover, nowhere in the cited references, do the inventors teach or suggest that the use of a sheet of thermoplastic material forming part of the external surface(s) of the blade can increase its impact resistance, as recited in claim 1.

Independent claim 1 is therefore patentable over Lallemand and McGrath *et al.* Because claims 7 to 9, 13, 14, 17 and 30 depend directly or indirectly from claim 1 and include by reference all of the features recited in claim 1, these claims are also patentable.

With respect to independent claim 31, for the same reasons as those set forth above with respect to claim 1, this claim is patentable over Lallemand.

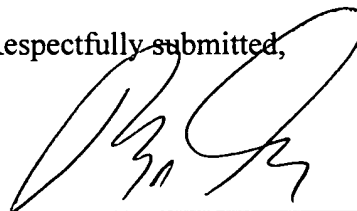
Moreover, there is no express or implied suggestion in Lallemand to identify the mesh 3 as being made of a thermoplastic sheets made of thermoplastic material selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate, as recited in claim 31.

Claim 31 is therefore patentable over Lallemand. Because claim 32 depends from claim 31 and includes by reference all of the features recited in claim 31, claim 32 is also patentable.

Conclusion

For the foregoing reasons, it is submitted that the Examiner's rejections are not well founded, and reversal of his decision is earnestly solicited.

Respectfully submitted,



Ralph A. Dowell
Registration No. 26,868

Date: 1/12/2007

DOWELL & DOWELL, P.C.
Suite 406 -- 2111 Eisenhower Avenue
Alexandria VA 22314
Telephone: (703) 415-2555
Facsimile: (703) 415-2555

Listing of Claims

- 1 (previously presented) A hockey stick blade with a shank and a blade element having a front external surface and a rear external surface, said hockey stick blade comprising:
 - (a) a core made of thermo-expandable foam and extending along a longitudinal axis;
 - (b) a first layer of fibers at least partially wrapping over said core; said first layer of fibers being impregnated with a suitable resin;
 - (c) a second layer of fibers at least partially wrapping over said first layer of fibers, said second layer of fibers being impregnated with a suitable resin; and
 - (d) a sheet of thermoplastic material covering at least partially said second layer of fibers, said sheet of thermoplastic material forming part of one of said front and rear external surfaces of said blade element for increasing the impact resistance of said blade.
2. (previously presented) A hockey stick blade as defined in claim 1, wherein said core comprises a blade element portion and a shank portion with a tenon portion.
3. (previously presented) A hockey stick blade as defined in claim 2, wherein said first and second layers of fibers also cover said shank portion of said core.
4. (previously presented) A hockey stick blade as defined in claim 3, wherein said sheet of thermoplastic material form part of said front and rear external surfaces of said blade element.
5. (previously presented) A hockey stick blade as defined in claim 4, wherein said shank comprises a front external surface and a rear external surface and said sheet of thermoplastic material also forms part of one of said front and rear surfaces of said shank.
6. (previously presented) A hockey stick blade as defined in claim 1, wherein said-sheet of thermoplastic material is a front thermoplastic sheet and said blade further comprises a rear thermoplastic sheet, said front and rear thermoplastic sheets forming part of said respective front and rear external surfaces of said blade element and said shank.
7. (previously presented) A hockey stick blade as defined in claim 6, wherein said thermoplastic sheets are made of thermoplastic material selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate.

8. (previously presented)A hockey stick blade as defined in claim 7, wherein said thermo-expandable foam is selected from the group consisting of polyurethane foam, ethylene vinyl acetate (EVA) foam, polyvinyl chloride (PVC) foam, ethylene polypropylene foam and polyisocyanurate foam.
9. (previously presented)A hockey stick blade as defined in claim 8, wherein said core comprises a first portion located above a second portion;
10. (previously presented)A hockey stick blade as defined in claim 1, wherein said first layer of fibers is a first fibers braid and said second layer of fibers is a second fibers braid
11. (cancelled)
12. (cancelled)
13. (previously presented)A hockey stick blade as defined in claim 9, wherein said first and second layers of fibers are made of woven fibers selected from the group consisting of carbon fibers, glass fibers, KEVLAR fibers, ceramic fibers, boron fibers, quartz fibers, spectra fibers, polyester fibers and polyethylene fibers.
14. (previously presented)A hockey stick blade as defined in claim 13, wherein said first and second layers of fibers are made of fibers crossing at between 30° and 60°.
15. (previously presented)A hockey stick blade as defined in claim 14, wherein said blade comprises an interface between said first and second portions, said interface comprising fibers oriented transversely relative to the longitudinal axis of said core.
16. (previously presented)A hockey stick blade as defined in claim 15, wherein said shank comprises a tenon adapted to be inserted into a hollow hockey stick shaft.
17. (previously presented)A hockey stick blade as defined in claim 16, wherein one of said front and rear thermoplastic sheets comprises an indicia.
18. (cancelled)
19. (cancelled)
20. (cancelled)
21. (cancelled)
22. (cancelled)
23. (cancelled)
24. (cancelled)
25. (cancelled)

26. (cancelled)
27. (cancelled)
28. (cancelled)
29. (cancelled)
30. (previously presented) A hockey stick blade as defined in claim 1, wherein said sheet of thermoplastic material is devoid of fibers.
31. (previously presented) A hockey stick blade with a shank and a blade element having a front external surface and a rear external surface, said hockey stick blade comprising:
 - (a) a core made of thermo-expandable foam and extending along a longitudinal axis;
 - (b) a first layer of fibers at least partially wrapping over said core; said first layer of fibers being impregnated with a suitable resin;
 - (c) a second layer of fibers at least partially wrapping over said first layer of fibers, said second layer of fibers being impregnated with a suitable resin; and
 - (d) front and rear thermoplastic sheets covering at least partially said second layer of fibers, said front and rear thermoplastic sheets forming part of said respective front and rear external surfaces of said blade element for increasing the impact resistance of said blade, said front and rear thermoplastic sheets being made of thermoplastic material selected from the group consisting of polyethylene, polyurethane, polypropylene, polyester, polystyrene, polyvinyl chloride and cellulose acetate.
32. (previously presented) A hockey stick blade as defined in claim 31, wherein said front and rear thermoplastic sheets are devoid of fibers.